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A Critique of the Role of Indian Government Bodies in the Management of the Water Resources of India

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Abstract: Water is indeed the most precious resource. However, due to man's unplanned development, the water resources have dwindled from planet earth in an alarming way. My paper traces the role played by the Indian government in the harnessing of water as an important resourses. In the paper I have also given a critique of the same which comprise an analysis of the various water related policies of the government of India and provides suggestions as how the water resourses can be managed more efficiently so that by saving this precious resourse we ensure a safe future for posterity

Key words: water, resource, management, water policies, water law

Introduction: What is water for a nation?

Water is the most essential resource that helps in the sustenance of life. As we all know that seventy percent of the globe is covered by water bodies, yet only a small percentage of this water is suitable for human consumption. According to the report by the United Nations Geological Survey Department, 97% of the water of our planet is salt water and only three percent is fresh water. Furthermore, most of this fresh water is frozen and is found as glaciers and in the polar regions which further adds to the difficulty of its availability. The remaining unfrozen freshwater is mainly found as groundwater, "with only a small fraction present above ground or in the air." Brazil is considered to have the largest fresh water resources in the world, followed by Russia and Canada.

Thus, we can see that although our planet has ample of water bodies, but due to lack of portable water, our planet is facing a grave water crisis with every tick of the clock. This crisis is further compounded by man's recklessness and insensitivity towards the natural resources of the planet. As a result water resources are dwindling at an alarming rate. Water is the prime necessity of our planet for sustainance of life. It is the symbol of life. Even the human body comprises 70% water. Unlike some of the other natural resources such as petroleum, metal ores, geothermal energy and the like, water is a resource that is not just vital for the humans but for every other life form on Earth. It is simply impossible to imagine life without water. However, it is unfortunate that due to unplanned and unmanaged developments made in various spheres of growth, our water bodies have become polluted. The situation has been aggravated further since the Industrial Revolution and other similar revolutions which brought about a paradigm shift from man's simplistic existence to a consumeristic approach. As a result of man's reckless attitude, today we face such grave issues like water crisis, global warming and the greenhouse gas effect. Today the situation is so acute that even the developed countries of the world are facing grave water crises. Even a developed city like Cape Town in South Africa is facing grave water crisis. In April 2017, "Day Zero" was observed in Cape Town. It was a day when the citizens of Cape Town were forced to cut down on their daily use of water to 50 liters per day or less. It was also forecast that if Cape Town did not manage its water resources judiciously, it could become the first major city in the world to run out of water. Other developed regions of the world including Southern California and a large part of Australia are also facing similar water crises. If this is the situation in the developed areas of the world, one can well imagine the water crisis that the developing and the underdeveloped countries would be confronting in the days to come. The water crisis is not a distant disaster, it is a crunch we are already experiencing in our day to day lives. If we wish to save ourselves and our future generations from the water crisis we need to address the water related catastrophe with utmost urgency through proper management of our resources.

Sources of Water:

As it has already been mentioned in the Introduction that although our planet is 97% water, but most of it is saline and therefore unfit for use. Thus, before the government of any country frames water related policies for its people, it needs to conduct a thorough study of the sources of water found in the country under consideration.

(a) Fresh Water Sources:

Fresh water is mostly found as surface water in the form of rivers, lakes and fresh water wetlands. Till some time back these fresh surface water sources had the capacity to meet the average consumption needs of the people. However, as a result of the

unplanned human activities, the water level of these water bodies is depleting at an alarming rate.

Another source of fresh water is the under groundwater. Underground water is mostly found in areas where karst topography such as pot-holes and underground rivers are found in abundance. Springs are also another source of fresh water.

Besides the flowing surface water and the underground water, frozen water is another important source of Fresh Water. Frozen water is mostly found in the form of icebergs and glaciers. The icebergs are being used as a source of water for research purposes and several schemes are also being conceived to harness it for commercial and domestic purposes as well. Glaciers are another source of Fresh Water. India is fortunate to have this valuable resource in abundance as the Himalayas are a perennial source of this fresh water resource and have extensive areas of glaciers which can be an important fresh water resource. Besides this ten of Asia's largest rivers flow from the Tibetan plateau region, out of which three branch out into India. But due to the environmental crisis that the world is facing, the temperature in this region has risen by almost 0.6 degree Celcius and most of the glaciers of this region have receded considerably. For instance, the Pindari glacier has receded by over one kilometer in the past decade. This is not a healthy trait as the diminution of glaciers would adversely impact the fresh water resources.

(b) Desalination of Saline Water: Desalination is an artificial process by which saline water is processed as fresh water. Desalination is mainly done through distillation and reverse osmosis. However, it is an expensive procedure. Desalination is mainly being used for agricultural use in places such as Singapore, California and the Persian Gulf. However, in the recent past sun-powered desalination is also gaining momentum in the villages of Gujarat and Maharashtra in India.

As water is not an infinite resource like the Sun, as was thought earlier, it needs to be managed judiciously so that the sustainability of the coming generations is safeguarded.

Sectoral Requirement of Water

After taking a look at the various sources of water, we see that it is quite evident that there are not enough sources of water left at our disposal. Thus, water needs to be managed efficiently. Before taking a look at the role of the government in framing the water policies let us now take a look at the water requirements and usage in the various sectors as knowledge of the same is a pre-requisite in framing sound water policies.

In earlier times, when man had limited wants and lived in harmony with nature, the water resources could be replenished and managed with considerable ease. However, with the advent of the scientific advancements and rapidly growing industrialization, water resources are being exploited indiscreetly. Due to excessive urbanization and industrialization, our water bodies are bearing the brunt of environmentally harmful activities such as deforestation and toxification and siltation in water bodies. With such limited resources our government has to cater to the requirements of the various sectors mentioned below:

Agricultural Sector:

Today it is estimated that 70% of the worldwide water is being utilized for irrigation. However, 15 to 35% of irrigation withdrawals are unsustainable. The International Water Management Institute in Sri Lanka, after conducting a research on the availability of Water Resources in the world, gave its findings that there is not enough water to meet the agricultural wants of the globe. Our country, India is no exception to this looming water crisis. With the growing population and increasing urbanization, the forested and agricultural areas are fast diminishing. Not only this, the water table due to excessive siltation resulting from man's unplanned activities, is also receding alarmingly. Today the world is witnessing that thinking of water as an exhaustible resource was a myth and therefore the water needs to be used judiciously. As with the alarming rate at which the population is growing, the agricultural requirements of the people are also increasing. Thus, the water policies being framed need to be agriculture friendly and should be instrumental in increasing the productivity of the land.

Industrial Sector: It is estimated that 22% of the worldwide water is used by the Industrial Sector. The industrial sector require gallons and gallons of water as solvent and a coolant. Water is also harnessed by the industrial sector to generate hydro-electricity. To set up hydroelectricity power plants, artificial lakes need to be created which require a large amount of water. Besides setting up hydroelectricity plants, water is also needed to generate thermal power for heavy industries. The thermoelectric power plants use cooling towers which consume enormous amounts of water. Thus hugh galons of water are required by the Industrial Sector.

Domestic Usage:

It is estimated that 8% of the water worldwide is used for domestic consumption. According to Peter

Gleik, a world renowned environmentalist, the water requirement of an average person is around 50 liters per day which includes sanitation, cooking, laundering and gardening. However, it is lamentable that due to unequal distribution of water there is a huge disparity in the distribution of water all across the globe. Whereas the haves control more than half of the water resources, the have nots especially in the underdeveloped and developing nations of Asia and Africa, hardly get even their basic requirement share of water. This disparity needs to be addressed by chalking out viable water policies.

Recreation

As the standard of living of people is improving, the percentage of the recreational use of water is also going up. Water sports like snorkeling, whitewater boarding, scuba diving and the like are gaining popularity among today's youth. As the disposable income of people is on the rise, people are constructing lavish bathrooms and swimming pools in their houses which have facilities such as sauna bath and Jacuzzi. Although such comforts increase the material standard of living of the people, it adversely impacts the limited water resources we have. Similarly maintenance of sports grounds and public gardens also consumes an enormous amounts of water. Although the government has made provisions to use either primary wastewater or exclusively treated effluent water, but in spite of these steps, a large amount of water goes waste in recreational activities. Recreation is important for our growth and development, but the water used for recreational activities should be monitored and it should be seen that too much of this precious resource does not go waste.

Environmental Usage:

Besides the above mentioned sectors, water is also being utilized for environmental purposes such as for creating natural or artificial wetlands, digging artificial lakes for wildlife, for impoundments, and the like. Utilizing water for addressing environmental related issues is a healthy practice, it needs to be encouraged.

The Need of managing water sources:

The alarming rate at which the water resources are depleting makes it imperative for us to manage our water resources with utmost care. Our planet is reeling under tremendous pressure to manage our water resources effectively.

Before me proceed with the government's role in the management of water resources, let us understand the concept of Water Stress. The idea of Water Stress came into being when the World Business Council for Sustainable Development, after conducting a thorough study of the limited water resources of the world, came up with their findings that the world is facing scarcity of water and that there is not enough water to satisfy the needs of all of the above sectors, this problem is worse in the developing and underdeveloped countries of Asia and Africa. The World Business Council for Sustainable Development opines the following view about Water Stress, "The available water per capita is more complex, however, entailing assumptions about water use and its efficiency. Nevertheless, it has been proposed that when the annual per capita renewable freshwater availability is less than 1,700 cubic meters, countries begin to experience periodic or regular water stress. Below 1,000 cubic meters, water scarcity begins to hamper economic development and human health and well-being."

The Reasons Responsible for Water Stress:

Population Growth:

Planet Earth is witnessing Water Stress at an alarming rate. One of the chief reasons for this crisis is the surge in the population growth during the past two centuries. According to the year 2000 census, the world population was 6.2 billion. It is further estimated by the United Nations that by the year 2050 the world population would rise over 9.7 billion. The main cause of concern for the population rise is that as it will largely effect the developing and under-developed regions, which are already reeling under tremendous water stress. Anticipating the grave water crisis that is likely to hit the world in the years to come, the World Business Council for Sustainable Development highlighted the importance of water conservation and recycling. Furthermore, the World Bank has also warned the nations that if the water resources are not managed properly the world will face unprecedented water crisis which will give rise to a number of water-related conflicts. It has also been predicted that there might be an inevitable third World War due to water crisis.

The World Bank has also notified that as due to issues such as climate change and global warming, the temperature of the Earth is also rising as evaporation of water in is taking place very fast, therefore, if the water resources are not managed effectively and in a sustainable way, it will create an adverse impact on the agricultural sector as it will be very difficult to produce food for the ever growing population in the decades to come.

Pollution of Water Bodies: To cater to the growing demands of the ever growing population, vast tracts of agricultural and forest lands are being converted

into industrial and residential spaces. Moreover, due to unplanned dumping of human waste, our water bodies are getting clogged and polluted. There is no proper treatment of sewage water before it is released into the water bodies. A lot of untreated toxic chemical waste of industries also goes into the water bodies which makes the water unfit for consumption. This is yet another reason which creates water stress and needs to be addressed if we wish to alleviate our planet from the water crisis it is facing.

Water Conflicts: It is a bitter truth that conflict is the root cause of any stress. This holds true for water too. As mentioned above, it is apprehended that the world might witness a third World War due to the exacerbating water crisis. Some of the eminent personalities have expressed their concerns regarding the water crisis in the following words. The former Secretary-General of the United Nations, Late Boutrous Ghali, avers, "The next war in the Middle East will be fought over water, not politics"; his successor, Mr. Kofi Annan, too expressed similar concerns thus, "Fierce competition for fresh water may well become a source of conflict and wars in the future". The greed of man has been the main reason behind the decline in the water levels of the various water bodies. One hears about the growing number of water related disputes on the television so much so that the politicians now-a-days are playing "Water Politics" for their political gains and complicating the issue further. There is a growing antagonism among nations, states and even localities with regard to controlling of water resources and this tussle for water seems to be irreconcilable with every passing day. The conflicts between nations and states with regard to the transboundary rivers such as the Indus, Brahmaputra, Jordan and Nile, which has been going on for decades stands unresolved till date.

Thus we see how the above mentioned reasons have been responsible for creating water stress on our water bodies. As this chapter relates with the role played by the Indian Government is managing the water resources, we will see how the Indian government has progressed with regard to the water related policies since independence.

This chapter will further focus on the role of the various central, state and local bodies with regard to the water policies. Furthermore, it will shed light on the challenges and the measures taken by the various bodies to manage the water resources in a sustainable and effective way.

An Overview of the Government Water Policies

Water is one of the most important resources that sustains life in our planet. Hence it is of utmost importance to preserve water and make judicious use of it. Besides making efforts at the individual level to preserve water, it is very important that the water related policies framed by the government at various levels keep in view the requirements of the various sector discussed above and also by safeguarding water for posterity. It has always been the endeavor of our governments to address the water related needs of the various sectors by framing viable water policies, but still a lot needs to be addressed so that the water can be utilized optimally and judiciously.

Before we discuss the water related policies of the government, we need to understand that most of the water related policies center around most of the major rivers that flow through the length and the breath of our country and are managed by the Central government. However, as our country follows decentralization as a form of governance, the center also transfers some of the authority with regard to water to the State governments. As the water management policies are crucial and involve the stakes of all people, they involve a lot of finances and also have a wide scope. However, one also needs to understand that as the water management issue involves a number of administrative and bureaucratic bodies and committees at both the central and the state levels, they are subject to bottlenecks and parochial interests.

As mentioned above as most of the water related policies of the government concern both the Centre and the State, they make use of the common resources of both the stakeholders and the government. The prime objective of the Centre regarding water policies is to ensure positive outcomes such as optimum national and economic growth by strengthening the water resource for the development of the nation as well as by safeguarding the interests and stakes of the people. The government also takes a leadership role in the planning, coordinating and implementing the water resource policy so that this precious resource is utilized sustainably.

The water related policies of the government are effective and designed keeping in view the welfare of the people. The government, being the custodian of its citizens has kept enough scope for all sectors including agriculture, industries and in the domestic front as well. Furthermore, there are also special provision to tackle situations of national emergencies such as floods and droughts. As mentioned earlier, as most of the water related matters have common stakes and are of national

interest, they propose cost-sharing provisions which are used to tackle common concerns.

The funds allocated to the Ministry of Water are used effectively to plan water policy strategies. According to J.V. S. Murty,

> There are several water policy strategies implemented by the Indian government which include continuing the status quo and encourage each state to develop its own policy coordinating with its neighboring state or those within the same river basin. The overall role of all governments is to promote the general welfare within the context of the political economy within which the government exists. A second premise is that the public interest in water resource system will, in many cases, best serve collectively because water resource systems are shared resources and cannot meet the needs of one interest or constituency without affecting the needs of others. A third premise is that priorities are best established and conflicts over resource allocation are best solved, at the lowest possible level of government to which the issue are internal.

Through the above view it is clear that our government takes into consideration the above mentioned premises while designing strategic water sharing collaborations between the various stakeholders to ensure public interests. There is an important clause relating to tackling unseen water related catastrophe which features in the water policy of the government. It states, "having a policy guidance process which anticipates and avers crises, saves the community many costs of crisis management and allows for conflict resolution at appropriate levels of government, starting with the lowest possible level." Hypothesizing a water crisis and having provisions to tackle it effectively is an important provision as it saves time and resources for future management.

The Background of the National Water Policies: Pre-Independence Era

The Water policies that govern our country today have their roots in the pre-independence era. In the pre-independence era, the Water resources were managed by the local bodies and the local communities. Before the advent of the British, the natural resources, be it the forests, the water-bodies or any other resources, were owned by the natives. People were passionate about their natural resources and used them scrupulously. Even if the cut down or lopped a tree, they would plant another one so that the ecological balance is maintained. Our ancient and medieval history give us accounts of emperors such as Chandragupta, Harshvardhan, Ashoka, Akbar, Firoz Shah Tughlaq who dug wells, made ponds, tanks and other water bodies for the general public. Even in the British era, the East India Company constructed large canals and dams mainly to address issues such as irrigation, and management of natural calamities such as flood and droughts, effectively. The Western Yamuna Canal which was constructed by Firoz Shah Tughlaq was renovated and modernized by the British. Similarly they also undertook the construction of the Upper Ganga canal which runs through Uttarakhand and Uttar Pradesh and also the Buckingham canal which starts from Kakinada and runs into the East Godavari districts of Andhra Pradesh. It is well-known that the British colonized and undertook some development works in India for their own benefit. For instance, they set up an extensive railway network in order to set up their trade, similarly they undertook construction of dams, reservoirs and waterways for their own benefit. Nonetheless, the construction of these water storage and conveyance structures made it possible for the country to be self-sufficient in food and also addressed the problem of droughts and floods.

The Post-Independence Era

After independence, large scale multi-purpose river valley projects were taken up by the government all over the country with the primary objective of making the country self-sufficient in food, management of floods, generation of hydro-electricity and catering to the water related wants of the nation. In the year 1945, just around the time when India was gearing up for independence, the Central Water Commission was set up which was vested with the responsibility of initiating, coordinating and furthering the water related issues of the nation. With the setting up of the Central Water Commission, a lot of water and agricultural needs of the nation were addressed. The Central Water Commission played a major role in the designing and execution of the Five Year Plans that were taken up to boost the Indian economy, post-independence. As a result of the strategic planning of the Central Water Commission, within a span of just a few years, the expanse of the irrigated agricultural tracts increased considerably and the

food grain production also quadrupled. It is estimated that with the Central Water Commission at the helm, between 1950 and 1995, over 500000 million rupees were spent on projects to create water reservoirs across the country (Vohra,1996). Later the Central Water Commission along with the Central Soil and Materials Research and eight subordinate offices also were merged into the Ministry of Water Resources. The Ministry of Water Resource was made in-charge to formulate policies, develop and manage water as a national resource. Thus, gradually with the setting up of the Ministry of Water Resources, the government took over the control of water resources from local stakeholders and also passed on some of the authority to the concerned state governments as well.

Water is one of the most vital resources and forms the backbone of our national economy. Therefore, it is vital that we make judicious use of this precious resources. The water resources of the world are dwindling at an alarming rate and there is no escape for India as far as this crisis goes. However, as India is a treasure-trove of natural resources, it can harness its water resources well. We all know that India is a peninsula, ie. it is surrounded by water on all three sides, furthermore, it has perennial life-giving rivers like the Indus and its tributaries like the Jhelum, Beas, Ravi and Sutluj, the Ganga and the Yamuna, and the Brahmaputra which fulfill the water requirements of the entire North Indian belt. In the peninsular India, the rivers are mainly fed by the monsoon rains. Due to the erratic nature of the Indian monsoons, people especially the farmers suffer from immense hardships. In the recent times, farmers, especially in the drought prone areas of Maharashtra are committing suicide because their irrigation requirements cannot be met. Thus, it is vital that the water resources of the country be managed efficiently through viable water policies which takes into consideration the requirements of the stakeholders from all the above discussed sectors.

India has a federal set-up. Seeing to the complex nature of water related issues, the the allocation of responsibilities with regard to water needs to be done through a national consensus. To address the water related issues of the country, The National Water Resources Council, under the Chairmanship of the Prime Minister, Mr. Rajeev Gandhi, adopted the National Water Policy on 9 September 1987. This Council was Reviewed and upgraded later on in the years 2002 and 2012 successively.

Legal Framework

As the disputes with regard to water arise because of humans, therefore, the legal framework with regard to water is formulated keeping in view the human rights. While the Constitution does not specifically recognize a fundamental right to water, the Indian judiciary is of the view that such a right can be implied in Article 21 of the Constitution under (The Right to Life). The Right to Water can be complemented with the Right to Clean Environment. There have been instances in our country's history when the Supreme Court of India has pronounced its verdicts recognizing the "Right to Life" as an important right. For instance, in the Subhash Kumar v. State of Bihar case, the Supreme Court recognized that the Right to life "includes the right to enjoyment of pollution free water and air for full enjoyment of life." Similarly in the Sardar Sarovar case, the Supreme Court went further and directly derived the Right to Water from Article 21 in which it stated that "Water is the basic need for the survival of the human beings and is part of the Right to Life and Human Rights as enshrined in Article 21 of the Constitution of India."

It is heartening that India's national water law is more progressive than the International Water Law. However, India lacks an umbrella framework to regulate its freshwater. The existing water law framework in India is an amalgam of a number of different principles, rules and acts adopted over many decades. These include common law principles and irrigation acts from the British period to the recent water policies and the judicial recognition of the right to water for humans. As a result of a lack of the umbrella legislation, a lot of discrepancies tend to crop up. For instance, the claims that landowners have over groundwater under common law principles are not attuned with a legal framework based on the human right to water.

In terms of statutory development, irrigation laws constitute historically the most developed part of the water law. This is due to the fact the colonial government saw the promotion of large irrigation works as central to its mission. Even today, some of the basic principles of water laws of our country derive from irrigation acts. The early Northern India Canal and Drainage Act, 1873 for instance, was implemented to take care of irrigation, navigation and drainage in Northern India. One of the long-term repercussions of this Act was the introduction of the right of the Government to "use and control the water of all rivers and streams flowing in natural channels, and of all lakes for public purposes." The1873 Act abstained from declaring state ownership over surface water.

The Statutory water law also includes a number of pre and post-independence enactments in various areas. These include laws on embankments,

drinking water supply, irrigation, floods, water conservation, river water pollution, rehabilitation of evacuees and displaced persons, fisheries and ferries. In general, under the Government of India Act 1935, the water laws are regulated by the State. This Act vests power to the States to legislate the water related matters. Thus, the States have the exclusive power to regulate water supplies, irrigation and canals, drainage and embankments, water storage, hydropower and fisheries. However, there are limitations with regard to the use of inter-state rivers. Further, the Union is entitled to legislate on certain major issues. These include shipping and navigation on national waterways, besides the power to regulate the use of tidal and territorial waters. The Constitution also has provision that the Union can legislate with regard to the adjudication of inter-state water disputes. As no functional clauses could be implemented at the time of the adoption of the Constitution, the substantive Inter-State Water Disputes Act was adopted in 1956. This Act introduces a procedure for addressing disputes among states concerning inter-state rivers that could not be resolved through negotiations. The Parliament also enacted the River Boards Act, which offers a framework for the setting up of river boards by the Central Government in relation to the regulation or development of an inter-state river or river valley. The River boards can advise state governments on a number of issues including, conservation, control and optimum utilisation of water resources, the promotion and operation of schemes for irrigation, water supply or drainage or the promotion and operation of schemes for flood control.

While the intervention of the Central government in water regulation is limited by the constitutional scheme, the importance of national regulation in water has already been recognised in certain areas. Thus, with regard to water pollution, the Parliament did adopted a Water Act in 1974. This act seeks to prevent and control water pollution and maintain and replenish the wholesomeness of water. It gives powers to water boards to set standards and regulations for prevention and control of pollution. Besides statutory frameworks, a number of Common Law principles linking access to water and rights over land are still prevailent in India. These include separate rules for surface and groundwater.

There is also a provision for Assessment Notification. Assessment notification provides a framework for assessing the environmental impacts of planned big hydropower and irrigation projects. Further, there are Guidelines for Environmental Impact Assessment of River Valley Projects, which provide a general framework since 1985 for assessing the impacts of planned big dam projects. With regard to displacement, the primary act that is enforced is the Land Acquisition Act, 1894. This colonial act, which was "enacted with the interests of the colonial government rather than the interests of displaced people in mind, gives the government significant control over the process of eviction."

Besides the laws, rules and regulation that comprise the water law, there is a substantial body of additional rules and regulations at the local level. These include a number of written or unwritten arrangements that regulate access the use of water for various purposes.

Over the years there have been a number of changes over time within the basic structure of water law, ranging from the popularity of a person's Right to Water to the inclusion of public interests. Water laws of India include a variety of laws that centre around the issue of water. The formulation of the water laws range from matters like the State's right to use surface waters within the public interest, to an individual's right to access to pollution free water. The water law of our country are dynamic and are formulated keeping in mind not just the present scenario but also the water related challenges that our country is likely to encounter in the future.

The current water law largely contribute towards enhancing water management however they are incapable of addressing the human right, social, environmental and health aspects of water. Thus, the need of the hour is to make the water laws more progressive so that the above mentioned aspects can be come under the purview of water laws.

India's National Water Policies

Let us now take a look at the three National Water Policies formulated by the Indian government and see how they have addressed the growing water demands of the country over the years.

National Water Policy 1987: According to the National Water Policy of 1987, water was recognized as a valuable national asset. This policy highlighted the importance of developing a database to manage water related data. It further expressed the need for proper planning of the water resources especially in the drought prone areas of the country. Besides this it also stressed the need to devise non-conventional methods for conservation of water like creating artificial recharge of ground water, desalination of brackish water, inter-basin transfer and the like. Furthermore, the draining basin was also recognized as the basic unit of planning for water resource development and seen as an important area required for the transfer of surplus

water, especially to meet the requirements of the water-deficit areas.

Besides utilization of water through non-conventional methods, the policy also underscored the usage of traditional conservation practices such as rain water harvesting for managing the water resources in an efficient way. The policy also prioritized water allocation thus: Drinking Water, Irrigation, Hydro-power, Ecology, Agro-Industries and Non- agricultural industries, Navigation and other uses. However, the council made provisions for modifications in this clause as per requirement. Another important clause that featured in this policy pertained to Resettlement and Rehabilitation. As we all know that if the water issue needs to be addressed on a large scale, it leads to displacement of the local population. Proper policies for the resettlement and rehabilitation of such displaced people needs to be formulated so that their stakes are not placed under threat. The policy also had provision for participation of the various sectors and stakeholders so that all the sectors are represented well while the water policies are framed. According to K.S. Murty in "India's National Water Policy and Water Management"

> For effective and economic management of our water resources, the frontiers of knowledge need to be pushed forward in several directions by intensifying research efforts in various areas…In view of the vital importance of water for human and animal life, for maintaining ecological balance and for economic and development activities of all kinds, and considering its increasing scarcity, the planning and management of this resource and its optimal, economical and equitable use has been a matter of the utmost urgency. The success of the national water policy will depend entirely on the development and maintenance of a national consensus and commitments to its underlying principles and objectives" (Government of India, 1987)

National Water Policy 2002

With time and owing to the emergence of new challenges in the water sector, the National Water Policy of 1987 needed to be revised. On 1st April 2002, the National Water Resources Council met and drafted and thereafter adopted the new National Water Policy of 2002. Like in the National Water Policy of 1987, the main thrust areas of the National Water Policy 2002 was setting up of a modern information system and database for promoting free exchange of data among the various agencies. Besides this, the other key points that were addressed in the National Water Policy of 1987, like Water Resource Planning, Project Planning, Groundwater Development, participation of Stakeholders and beneficiaries, flood management and irrigation, use of science and technology and training of personnel and the stakeholders like farmers, were involved in the project. As the Water Policy of 2002 was an upgrading of the water policy of 1989, it has special provisions, for instance, there was a special clause for ecology, agro-industries and non-agricultural industries and navigation in this policy. As the gross irrigation potential of the country had increased manifold between the years 1989 and 2002, this policy underscored the importance of adopting scientific and non-conventional water management techniques such as the use of sprinklers and drip systems of irrigation, artificial recharge of ground water, rainwater harvesting, inter-basin transfer, wherever feasible. It also discusses the implementation mechanisms that would assist reclamation of water-logged and brackish lands by scientific and cost effective methods. Besides this the policy also emphasized on the need to generate a public awareness regarding water conservation.

National Water Policy 2012

After a span of nine years, the National Policy of Water 2012 was formulated by the government of India. Keeping in mind the urgent need for conservation of water, the National Council of Water highlighted the importance to privatize the water-delivery services and to treat water as an economic good. However, the provision to privatize water-delivery services and for labeling water as an economic good has been subject to criticism and was not well received by many states. This policy digressed from the previous two policies as it does away with the water allocation priorities stated in the Water Policies of 1987 and 2002.

One of the primary principles of the National Water Policy 2012 is that planning, development and management of water resources need to be administered by common integrated perspective, having an environmentally holistic basis with collaborative efforts from local, regional, State and national bodies, and further keeping in view the human, social and economic needs of the country.

The Policy under para 2.3 states that,

> There is a need for comprehensive legislation for optimum development of inter- State rivers and river valleys to facilitate inter-State coordination ensuring scientific planning of land and water resources taking basin/sub-basin as unit with unified perspectives of water in all its forms (including precipitation, soil moisture, ground and surface water) and ensuring holistic and balanced development of both the catchment and the command areas. Such legislation needs, *inter alia*, to deal with and enable establishment of basin authorities, comprising party States, with appropriate powers to plan, manage and regulate utilization of water resource in the basins.

Underscoring the importance of integrated water resources management, the policy under para 12.4 states,

> Integrated Water Resources Management (IWRM) taking river basin / sub basin as a unit should be the main principle for planning, development and management of water resources. The departments / organizations at Centre / State Governments levels should be restructured and made multi-disciplinary accordingly.

Besides the above discussed points, the National Water Policy of 2012 has special provisions for access to minimum quantity of portable water for domestic purposes and aims to remove the incongruities between the water requirements and usage in rural and urban areas. It further states curtailing subsidy to agricultural electricity users and to give impetus to ecological concerns. Furthermore, it has provisions for setting up of a Water Regulatory Authority that would regulate and monitor the release of water for various sectors and gave statutory powers to Water User Associations to maintain the distribution system. Most importantly it has provisions for rehabilitation of displaced families. Foreseeing the paucity of water in the years to come, the policy gives incentive to effluent treatment. Last but not the least, the policy had provision to support a National Water Framework Law.

Water Policy and action Plan for India 2020: An Alternative

The Government of India formulated three consecutive water related policies, discussed above, in order to address the water related issues of the country. However, to cater to the demands of the ever growing population, the government needs to bridge the gap between the depleting water resource the ever growing water requirement. As the issue of water is always in a flux, the water policies of yesteryears tend to become obsolete. The first Water Policy (1989) was formulated in the pre-liberalization days and therefore addressed the welfare concerns of the people. However, with the coming of liberalization, there has been a paradigm shift in the government's approach towards the management of water resources as the government now considers itself a service facilitator rather than a service provider. We also saw how in the recent water policy, the government categorizes water as an economic commodity to ensure its effective and judicious usage. Nonetheless, the water crisis that confronts us is so acute that although three substantially effective National Water Policies have been adopted by the Indian governments since independence , yet the ever growing water related concerns and challenges call for new water policies and novel action plan for effective management of water resources in the country.

National Water Mission - National Action Plan on Climate Change - Ministry of Water Resources (2009, 2008)

In order to conserve water the National Water Mission has resolved to safeguard the water resources. The following excerpts from the document elucidate on the objectives and the action plan drafted by the Mission to manage our dwindling water resources effectively.

The following Comprehensive mission document by the Ministry of Water Resources (MoWR) highlights the objective of the National Water Mission, which aims "conservation of water, minimizing wastage and ensuring its more equitable distribution both across and within States through integrated water resources development and management".

The five identified goals of the Mission are as follows:

The five identified goals of the Mission are as follows:

a. To prepare a comprehensive water data base in public domain and assess the impact of climate change on water resource

b. Promotion of citizen water right and state action for water conservation

c. Focused attention to over-exploited areas

d. Increase water use efficiency by 20%,

e. Promotion of basin level integrated water resources management

Some of the important functions of the Mission are as follows

• Review of the National Water Policy

• Carry research on all aspects of water related to the impact of climate change on water resources

• Effective implementation of water resources projects particularly the multipurpose projects with carry over storages

• Promotion of traditional system of water conservation

• Intensive programme for ground water recharge in over-exploited areas

• Incentivize for recycling of water including wastewater

• Planning on the principle of integrated water resources development and management

• Ensuring convergence among various water resources programmes

• Intensive capacity building and awareness programme including those for Panchayati Raj Institutions, urban local bodies and youths

• Sensitization of elected representatives of over exploited area on water related issues and to promote investment under water management through NREGA

For accomplishing the objectives of the Mission, long-term sustained collaborations with the State Governments have been envisaged. The most important step is to put in place the appropriate mechanism for coordinated actions followed by intensive capacity building and awareness programme up to the grass root level which comprise the Panchayati Raj Institutions, Urban Local Bodies, Water User Associations etc. The Mission also has the provision to rope-in all sections of the society, particularly youths in its projects. Besides research activities related to implementation of development programmes, some of the specific action points which are planned to be completed in a time bound manner are as under:

- To prepare a comprehensive water data base in public domain and an assessment of the impact of climate change on water resources
- To review and establish network for collection of additional necessary data
- Development of water resources information system and bringing all information in public domain except the data of classified and sensitive nature
- Reassessment of basin wise water situation
- To study impact of climate change on water resources based on reliable data
- Promotion of citizen and state actions for water conservation
- To formulate river interlinking projects
- Focus attention to over-exploited areas
- To promote intensive rainwater harvesting and groundwater recharge programme
- Intensive rainwater harvesting and groundwater recharge programme to cover all the blocks and districts
- To increase water use efficiency by 20%
- Develop guidelines for recycling of water including wastewater
- Develop guidelines for water-neutral and water-positive technologies
- Develop guidelines for improving efficiency of urban water supply system
- Prepare guidelines and manuals for mandatory water audit including those for domestic purposes
- Review financing policy and allocations
- Undertake pilot studies in collaboration with states
- Promote basin level integrated water resources management
- Prepare guidelines for different uses of water like irrigation, domestic purpose, industrial sector particularly in context of basin wise situations
- Review National Water Policy and adopt revised policy

A dedicated Mission Secretariat has also been proposed through creation of three posts i.e., one Mission Director and two Advisors and with provision for either outsourcing or redeploying services of professional as per requirements.

Guidelines for Repair, Renovation and Restoration of water bodies with External Assistance and Domestic Support: Ministry of Water Resources (2009)

The following document released by the Ministry of Water Resources provides information and details on the "Repair, Renovation and Restoration of Water Bodies" scheme that has been launched by the Ministry under the State sector, one with Domestic Budgetary Support and the other with External Assistance. The documents describe the details of the schemes and provide guidelines on the steps that need to be taken for planning and implementation of projects under this scheme.

"Under this scheme, about one lakh water bodies having a Culturable Command Area (CCA) of 9 lakh hactares at a cost of Rs. 4,000 crore including the share of Rs. 1250 of the centre would be covered. The main objectives of the scheme are:

- Comprehensive improvement of selected tank systems including restoration
- Improvement of catchment areas of tank
- Community participation and self-supporting system for sustainable management for water bodies covered by the programme
- Ground Water Recharge
- Capacity Building of communities, user groups standing committee for Panchayats and State Government/Central Government Agencies concerned with the planning, implementation and monitoring of the project.
- Increase in storage capacity of water bodies.
- Improvement in agriculture/horticulture productivity and increase in recharge of ground water in downstream areas of water bodies.
- Environmental benefits through improved water use; irrigation benefits through restoration of water bodies, supplementation of the groundwater use and promotion of conjunctive use of surface and ground water
- Development of tourism and cultural activities
- Increased availability of drinking water

The funding pattern for the scheme is as under:

1. For Special Category States (North-Eastern States including Sikkim, Himachal Pradesh, Jammu & Kashmir, Uttarakhand and undivided Koraput, Bolangir and Kalahandi (KBK) districts of Orissa) as well as projects benefitting drought prone/tribal/naxal-affected areas, 90% of the project cost will be provided as Central Assistance (grant) by the Government of India and 10% of the cost by State Governments.

2. For Non-special Category States 25% of the cost will be provided as Central Assistance grant by Government of India and 75% by the State Governments.

3. 10% of the project cost will be earmarked by the State Governments for capacity building, awareness and institutional strengthening.

4. Out of the Central Plan, outlay of Rs. 1250 crore available for the scheme during the XI Plan, 5% of the central share shall be made for strengthening of implementation mechanism, concurrent evaluation and impact assessment to be carried out by the independent agencies identified by the Ministry of Water Resources and will be released on the recommendation of the Ministry.

Planning of the projects under the scheme:

The States may take up planning and implementation of projects under the scheme generally in the manner outlined below:

Identification and selection of water bodies:

1. A project may be prepared with an individual water body or for a group of water bodies with sub-basin approach. All public and community owned water bodies may be covered under the project. All water bodies included in the project will be given a unique code number. The States will accordingly undertake census of these water bodies and get complete list of water bodies along with unique code in the first stage.

2. The States may take up the repair, renovation and restoration of water bodies having original irrigation Culturable Command Area up to 2000 hectare or less, for drinking water, irrigation, pisciculture, tourism, ground water recharge or any other purposes.

3. Private owned water bodies are not to be considered for funding under this scheme.

Preparation of Detailed Project Reports (DPR):

The DPR of a project should furnish information on the following aspects:

Details of present status of the water bodies (in use or partially used or not in use) with reasons for deterioration in condition and also its categorization in terms of location in (i) special category states/ Districts (North-Eastern States including Sikkim, Himachal Pradesh, Jammu & Kashmir, Uttarakhand and undivided Koraput, Bolangir and Kalahandi(KBK) districts of Orissa) (ii) drought prone, tribal and naxal-affected areas in non- special category states (iii) other areas not covered under category (i) and (ii).

Rainfall during the last ten years, ground water level, land use pattern, soil characteristics, climate conditions, availability of water in the catchment area for channelization into water body, water quality situation in the water body and adjoining areas.

Details of original CCA, present CCA and CCA planned in the DPR, original storage capacity/present storage capacity and storage capacity planned in the DPR, water quality situation in the water body and of ground water in adjoining areas with likely impact of the project on water quality of the water body and of the ground water.

Scope of the work :

Scope of work in the DPR may include the following:-

De-silting in terms of quantum of silt to be removed, repair of conveyance system, strengthening of *bunds*, repair of weirs and sluices, catchment treatment, command area development, soil erosion prevention works and quality control measures.

The scheme envisages capacity building of implementing agencies such as Ministry of Water Resources (MoWR) and its attached and subordinate offices, State Governments, District Implementing Agencies, Water Users' Associations (WUAs) and Panchayats.

Accordingly, a capacity building programme aimed at sensitization of stakeholders, identification and selection of water bodies, preparation of Detailed Project Reports (DPRs), monitoring and evaluation needs to be prepared and included in the DPRs.

Moreover there are plans for merging of the programmes of the Ministry of Water Resources with other programmes such as the National Rural Employment Guarantee Programme (NREGP), the Watershed Development Programme and the schemes of the rural drinking water supply. The joint guidelines with regard to the convergence between NREGP and other programmes of Ministry of Water Resources have already been issued in this regard. Plan for convergence with schemes of the Agriculture Department aimed at generating additional irrigation potential and increasing water use efficiency; with schemes of ground water department and Central Ground Water Board (CGWB) aimed at ground water recharge and with schemes of Drinking Water Supply Department of the State aimed at sustainability of drinking water sources are in the pipeline. The benefits under the project will include creation of additional irrigation potential, increase in horticulture/pisciculture production and increase in recharge of ground water, increase in availability of drinking water and promotion of tourism and culture, to name a few.

Implementation of the Scheme: The scheme will be implemented in the following way:

Arrangements at the Central Level

The Ministry of Water Resources will coordinate the programme at the central level.

Arrangements at the State Level

1. A State Level Nodal Agency (SLNA) will be identified by the State Government which will be responsible to plan various activities envisaged under the scheme, monitor their implementation, provide guidance to DLIA & DLI&MC and ensure coordination amongst all concerned departments/agencies at the State level.

2. The State Government may engage the services of competent agencies to support activities for awareness creation, capacity building, preparation of DPRs and monitoring of the scheme.

3. A Technical Advisory Committee (TAC) will be constituted by the State to techno-economically update and approve the DPR. TAC shall also include representatives from Central Water Commission (CWC) and Central Ground Water Board (CGWB).

Arrangements at District Level

1. At the district level, the concerned State Government will identify, and if necessary, promote an Implementation Agency for the scheme which will coordinate the programme. There will be a District Level Implementation and Monitoring Committee (DLI&MC) under the chairmanship of District Collector to decide issues relating to implementation, management, supervision and effectiveness of the project. The Committee shall include district level nodal officer from CGWB.

2. District Magistrates/Collectors will constitute DLI&MCs and get the strategy/perspective plans for implementation of scheme finalized.

Arrangements at Village/Block Level

1. At the grass root level, the scheme needs to be implemented either by the local Panchayat or a government agency identified by the District Level Implementing Agency.

2. The completion plan of the project will be placed before the Gram Sabha and its cooperation will be solicited for timely completion of the project.

Monitoring and Evaluation:

1. The project needs to be monitored at each stage regularly. The monitoring has to be done regarding the maintenance of both the physical and financial progress and the outcome. Monitoring needs to be done with the association of the Standing Committees at the various level.

2. Baseline survey needs to be conducted before the execution of the project begins. The evaluation and impact assessment of the scheme is to be be done by independent agencies which are to be identified by the Ministry of Water Resources. Furthermore, necessary reports and field visits need to be made on regular basis for the purpose.

The National Water Development Agency

For the optimum utilization of water resources and for giving a concrete shape to the water related policies of the government, the Ministry of Irrigation established National Water Development Agency (NWDA) in the year 1982. This agency is an autonomous agency registered under the Societies Registration Act of 1860s and was primarily established with the aim to address the water related issues in the peninsular region. This proposal was first placed by Arthur Cotton in the pre- independence times. However, due to a number of issues, this proposal could not be implemented effectively back then. In the post-independence era, in 1972, Dr. K. L. Rao, former Irrigation Minister and a famous dam designer, proposed to construct a national water grid with the aim to eradicate the water shortage of the southern seasonal rivers and the frequent flooding in the north Indian rivers. Dr. Rao surveyed the Indian rivers and submitted his report in which he found that there was an uneven distribution of water in the Indian rivers. On the one hand, some of the Indian rivers, in particular the rivers of the North, have surplus water levels whereas some rivers, especially those of the south, have very low water levels. Dr. Rao wanted to find a solution to this problem through which water from the rivers with surplus water could be siphoned off to the river basins with low levels of water. Dr.Rao's expertise in the field were roped in by the National Water Development Agency in the projects undertaken by them. Later in the year 1977, Captain Dastoor initiated the concept of Garland Control which talked about harnessing all the major Himalayan rivers for multi-purpose river projects. Although this concept was well received by all the stakeholders and the beneficiaries of the various sectors, it could not get implemented as it was not techno-economically viable.

In the year 1985, the Ministry of Irrigation was reconstituted as the Ministry of Water Resources. Gradually the Ministry modified the functions of NWDA and included the Himalayan Component in the Agency in the year 1994 and subsequently the Society and Governing Body on13 February 2003 and 12 March 2004 respectively. In 2006, it was decided that NWDA would consider the linking of sub-basins of rivers in States like Bihar. Later on, it was decided that NWDA would prepare the detailed project report of the Ken-Betwa link, which was one of the priority links spelled out in the Peninsular Component design of National Perspective Plan. As the National Water Development Agency now encompasses the entire country, and is now a major river-linking project too, it can be utilized to resolve all the water related issues of the country. Till date the NWDA has prepared 14 river linking proposals for the North Indian Himalayan Rivers, 16 proposals for the rivers of Peninsular India and 37 proposals for the inter-state river linking projects.

The NWDA has a vast experience and has played a vital role in resolving many water related issues of the country. However, many interest groups and social activists have raised concerns about the feasibility of the proposals presented by the NWDA. A PIL was also filed in the Supreme Court with regard to the issue in 2002 which was finally disposed by the Supreme Court in 2012. However, the Supreme Court directed the Ministry of Water Resources to constitute a committee of experts with regard to the interlinking of the river projects.

Subsequently by 2015, fourteen viable inter-links under consideration for the Himalayan component of the plan were identified. These are as follows: The Ghaghara–Yamuna link (Feasibility study complete), the Sarda–Yamuna link (Feasibility study complete) theYamuna–Rajasthan link, the Rajasthan–Sabarmati link, the Kosi–Ghaghara link, the Kosi–Mechi link, the Manas–Sankosh–Tista–Ganga link, the Jogighopa–Tista–Farakka link, the Ganga–Damodar–Subernarekha link, the Subernarekha–Mahanadi link, the Farakka–Sunderbans link, the Gandak–Ganga link, the

Chunar–Sone Barrage link and the Sone dam–Southern tributaries of Ganga link.

Similarly in the Peninsular India the scheme was divided into four major components which are as follows:

- Interlinking of Mahanadi-Godavari-Krishna-Palar-Pennar-Kaveri,
- Interlinking of West Flowing Rivers, North of Bombay and South of Tapi,
- Inter-linking of Ken with Chambal
- Diversion of some water from the West Flowing Rivers

The inter-links under consideration for Peninsular component are as follows:

The Almatti-Pennar Link , the Inchampalli-Nagarjunasagar Link, the Inchampalli– Pulichintala Link, Merged with Inchampalli–Nagarjunasagar Link, the Mahanadi–Godavari Link, the Nagarjunsagar-Somasila Link, remodeled as Srisailam to Somasial reservoir via the Veligonda Project tunnel, the Pamba–Anchankovil–Vaippar Link, the Par–Tapi–Narmada Link, the Parbati–Kalisindh–Chambal Link, the Polavaram–Vijayawada Link, the Somasila–Grand Anicut Link Srisailam–Pennar Link, to name a few.

Roles and Functions of State and local Governments in the Management of Water Resources:

As per the 73rd Constitution Amendment Act, 1992, beside the Government's role in the management of Water Resources, it is also the responsibility of the local bodies both at the urban and rural levels to manage water resources efficiently. The Role of Local Bodies in Water Management is to implement the national policies smoothly and effectively at the ground level. As it has already been discussed that as our country has a federal system of governance where governance is decentralization so that the policies framed and decisions taken at the apex percolate down to the masses.

As discussed in the earlier sections of this chapter, the Ministry of Water Resources frames the water related policy but ultimately it is the local bodies which implement the policies at the ground level effectively. We have a federal system of governance in which the policy framework decided by the union government is implemented by the concerned state governments. Furthermore, there is a decentralized mechanism which includes district to village level bodies. All these bodies play a crucial role in the management of water resources of the country. The participation of the local bodies in regulating the water related matters is very important as at times National Policy on Water framed at the Centre does not address the local concerns effectively. In India, at the District level, in the urban administration the municipal corporations, nagar nigams and municipal councils and at the rural levels the zila panchatats are the bodies that manage the water resources. Similarly at the block and village levels it is the Panchayat Samiti and the Gram Sabhas that see to the management of water resources. In the recent times besides these administrative bodies a number of NGOs have also been roped in by the government to manage the water resources. These bodies look into the maintenance of water supply and also see to environmental cleanliness including safe disposal of waste. Furthermore, they prepare strategies for planning, promotion, capacity building, and scaling up the water and sanitation related programmes.

As we know that our water resources are depleting at an alarming rate, it is important that the local administration harness the traditional techniques of water management at the local level and also utilize the expertise of the indigenous or local people to replenish our water resources. For instance, there have been a number of traditional water storage systems which are also environment friendly that were being used efficiently by our ancestors. However, with the passage of time and with the advent of modernization, we have turned a blind eye towards these ancient techniques and practices of water conservation. These techniques need to be revitalized again in order to solve the problem of water scarcity. It is the duties of our local bodies such as the nagar nigams and municipalities to provide portable water to the people. Our governments should understand that the fresh water sources belonging to the general public, whether at the urban or the rural areas, should prioritize water for the welfare of the people. Before funneling off the water of an area of a particular region to big industries, the consent of the locals should be taken and their view regarding water managdement respected as the people have a right over their resources. However, most of the times it is seen that their rights are quelled by the interest groups such as the industrialists who influence and manipulate the policy making decisions. Such policies should not be devised which subdue the local voices and such mechanisms need to be developed which guarantee the democratic participation of the rural people regarding the water management. There have been many examples where big industrial interventions

have destroyed the traditional waterbodies of rural areas like the rivers, lakes, ponds and other water bodies. Deforestation for industrial purpose has been a major factor responsible for depletion of the water table. The locals have a good understanding of their habitat and their voices should be taken into consideration while framing water policies. One such provision features under Section 13 of the Chapter 33 of our constitution which is called Public Hearing. A Public hearing is, "a formal meeting for receiving testimony from the public at large on a local issue, or proposed government action." In Public Hearing testimony from both the parties embroiled over an issue is recorded for documentation. Public Hearings take place at all the levels of government. Usually public hearings are formal proceedings. However, at times they may be less formal, thereby meaning that they may or may not be sponsored by a government body or might not even require the representation of both the parties in an issue. These public hearings are also called Accountability Sessions as they ensure accountability of matters related to the general welfare. In light of this, even the Father of our Nation, Mahatma Gandhi, had also endorsed the empowerment the villagers and had crusaded for vouchsafing the natural resources for the sustenance of the villagers when he laid down the concept of "Swaraj". He further underscored the need to authorize the gram panchayat with regard to the matters relating to the village. In this regard the Constitutional amendments 73 and 74 of the Indian constitution, safeguards the rights and the women and the local bodies. Similarly Article 40 of the Indian constitution, "directs the government to establish panchayats to serve as institutions of local self-government." Most of the states executed this directive principle in light of the recommendations of the Balwantarai Mehta Commission Report. According to the recommendations of the Balwant Mehta Commission, a 'three-tier' system of Panchayati Raj institutions (PRIs), including the gram panchayat, at the village level, the Block council or the panchayat saphithi at the Block level, and the district council (or the Zilla Parishad) at the district level be authorized to manage the local matters of a particular area.

Similarly should be the management in the urban locals as well. As we all know that India is a fast developing country, where urbanization is spreading rapidly. In this way urbanization plays an important role in determining the water policies of the government. It is a known fact that due to unplanned development of cities, which includes sanitation too, our water bodies are getting contaminated. Owing to the phenomenon of concretization in cities the water bodies there are getting clogged, thus, the village water resources are becoming channels to cater to the urban needs. Thus, our policy makers should bear in view that whenever a new policy is formulated, there should be strategic planning in which the interests and stakes at all the three tiers ie. at the national, state and local levels (urban and rural) need to be considered. Furthermore, there should be a pro-active participation of all the stakeholders. There should be training camps and workshops in which people should be given hands-on training on small scale water management and storage techniques such as Rain Water Harvesting, building small-scale waters, tube-wells and the like. Besides the above mentioned points the policy makers should also be sensitized about the ground realities while framing the policies. All this will strengthen the water related matters and will be instrumental in effective execution of the policies.

The Role of Government Organizations in Water Conservation

From the above discussion it is clear that since independence all the governments have given top priority to water management in their respective mandates. Through initiatives like the formulation of the three water policies of 1987, 2002 and 2012; National Water Development Mission, formulation of water friendly laws, the Water Development Agency, and the like, discussed above, it is evident that there has been proper management of water in our country. Besides the initiatives taken at the Centre, State and the local levels, there other departments, discusses below, have also made contributions in proper water management on our country. Let us now take a look at the various departments and the laudable staps undertaken by them fir conservation of this precious resource.

The Railways

The Railways Department was the first department in the transportation sector to launch a policy on water conservation policy. The water policy adopted adopted by the Railways Department envisages participation of private players in recycling water for non-potable usage on BOOT (build, own, operate and transfer) basis. The policy includes all facets of water usage including recycling, conservation and recharge of ground water. It also aims to improve water usage efficiency by setting up recycling plants, sewage treatment plants, effluent treatment plants and by rainwater harvesting on railways land. The Railways Department, besides playing a pro-active role in water conservation also ropes in private players like private industries and the Non-Government Organizations in their project and encouraged them to set up water treatment plants

and further ensures that the Railway Department would purchase treated water from these units. This is indeed an eco-friendly step taken by the Railways. The Water Policy of our country is an important link in the commitments made by India to the UN under the Intended Nationally Determined Contributions (INDCs) to reduce water consumption and the Railways has played a remarkable role in it. The Railways have also issued also green certificates to the private players such as the Diesel Locomotive Factory at Varanasi, the Perambur Carriage Workshop at Chennai for their efforts in water conservation.

The efforts of the Indian Railways to revive 1,500 water bodies on its premises has got an impetus as four restored wells in Hyderabad division have started yielding 4.70 lakh litres of water per day, promising a saving of over Rs 22 lakh per month. Besides this, the Railways have also been working on the revival of water bodies located on its premises and along the tracks across the country. According to the latest data prepared by railways there are 1,561 water bodies in the form of ponds, dams, reservoirs, wells and step wells existing on rail land. While some ponds, wells and step wells have completely run dry, many water bodies are partially dried up and therefore are not in use. However, the railways is making efforts to recharge these dried-up water bodies. For instance, four unused wells in Hyderabad division of south central zone have been revived. The total yield from these revived wells is about 4.70 lakh litres per day and the division is expected to save Rs. 22.80 lakh per month. Highlighting on the replenishment and protection of the water bodies, the railways has carved out a separate directorate to carry forward the water conservation plan in a focused way which besides undertaking other water management measures makes special efforts to supervise the various Railway zones to undertake measures for the revival of water bodies and also carries out regular water audits to reduce water consumption substantially.

As droughts are very frequent in India, the Indian Railway has also decided to set up automatic coach washing plants at 10 major depots to save water required for cleaning trains. Further, the Railways has also taken the initiative of setting up will effluent treatment and water softening plants for recycling water.

The Central Water Commission

Central Water Commission is a premier Technical Organization of India in the field of Water Resources and is presently functioning as an attached office of the Ministry of Water Resources, River Development and Ganga Rejuvenation, Government of India. The Commission initiates, coordinates and promotes schemes for control, conservation and utilization of water resources throughout the country. Issues like flood control, irrigation, navigation, drinking water supply and water power development in consultation of the State Governments concerned state are taken care of by the Commission. Besides this the Commission also looks into improving performance of irrigation projects to enhance agricultural productivity. The Central Water Commission undertook such exercises since the eight five year plan period and till the end of the Ninth Five Year Plan, has completed evaluation studies of 110 major and medium irrigation projects from various regions / states of the country. Besides performance evaluation of irrigation projects, benchmarking of irrigation systems has also been taken up by the Commission since 2002. Benchmarking provides an effective tool for measurement of relative performance of irrigation projects and suggests ameliorative measures for performance improvement. The Central Water Commission has framed General Guidelines for Water Audit to cover broadly three main sectors of water usage viz. agricultural, domestic and industrial. The aims and objectives of these guidelines are “to introduce, standardize and popularize the water audit system for conservation of water in all sectors of water use and improve the water use efficiency.”

Educational Institutions and Universities

In the recent past, and especially as a result of the mass awareness drives initiated by our Prime Minister Modi, the educational institutions are being roped in in the various water conservation drives and other similar endeavours. These institutions are conducting various awareness drives with regard to water management. As per the mandate issued by the government to various educational organizations, these institutions are constructing various water saving techniques like Rain Water Harvesting, creating small-scale water reservoirs, and other environment friendly plants at their campuses which are helpful in reducing Carbon Footprints. Some of the laudable initiatives taken by some exemplary Universities are as follows:

The National Service Scheme (NSS) programme of the University of Pune launched a Continuous Contour Trenches (CCT) programme for watershed management and dug 1.5-lakh meters of CCT in 52 hillocks. This initiative was undertaken by 192 colleges. Under this programme 120 programme officers and 6000 NSS volunteers were trained by Maharashtra Knowledge Corporation. This team planted 1200 thousand trees in these trenches. This

endeavour was undertaken to promote vegetation growth which would further help in raising the water table of the region. Watershed management is the need of the hour not only for the soil conservation and ground water conservation, but also for enhancing the nation economy and providing a solution for employment generation in draught prone areas of the country.

Another noteworthy example of students' participation in such a worthwhile endeavour took place at Bhavnagar University, Gujarat, two decades back under the guidance of the, then Vice Chancellor of the University Prof. Vidyut Joshi. The coastal city of Bhavnagar was facing a severe drinking water crisis. Prof. Joshi initiated the digging of a percolation tank in the university premises. About 650 students, 245 teachers and other employees of the university worked as voluntary labour for digging bore wells. Since then, every monsoon, the water in the wells gets automatically recharged.

HITS, Hindustan University campus, Chennai Effective Water Management

In another laudable move, the Hindustan Institute of Technology and Science HITS, Chennai, used another effective water management technique to provide an answer to deal with the non-availability of Municipal Water connection and diminishing Ground Water in their campus by collecting rain water to recharge the existing wells and other water bodies such as ponds and lakes inside the campus. In addition they also devised mechanisms to use recycle water for purposes such as gardening and flushing the restrooms. This move by the students of the University resulted in saving of water considerably. Besides this they also erected Rain Water Harvesting plants and created ponds to solve the water crisis in their campus. Besides the above mentioned initiative of the students of the University, they also launched a Decentralized Waste Management policy which proved to be quite effective and economical. Under this policy multiple sewage and garbage treatment plants were erected in the campus where waste from cafeterias kitchens and other places was collected and used effectively for making manure. Recently the University is also planning to set up a BioGas Plant in its campus.

In the same lines to conserve water, the Central University of Rajasthan has constructed a series of ponds under an integrated rain water harvesting scheme. The total area covered under this scheme is 217 hectare(ha). In this project the total catchment is divided into seven parts having area of 11 ha, 15 ha, 8.5 ha, 2.5 ha, 18 ha, 56 ha, 42 ha and 64 ha. As per this scheme, ponds are dug and water gets collected into ponds. Moreover, eight buildings are exclusively reserved for this scheme. These buildings are equipped with water harvesting and sewer re-charge system and provide water to 30 bores, which in turn raise the ground water table of the area. Further, two artificial water bodies on either side of the campus having a capacity of 20 crore litres, have been erected. These water bodies do not just add to the scenic beauty of the campus but also help in maintaining a favourable microclimate of the University and attracts birds like egret, black birds, ibis, heron and lapwing.

There are similar success stories in educational institutions throughout India and they go to prove that management of water resources by the end users themselves can lead to sustainable benefits. Such community based systems of resource management are not new to our society. They have been practiced by many traditional communities in our country since long. Due to the initiatives of the government, these traditional techniques of recharging water levels are being complemented by the modern techniques of water management.

More Water Relative Initiatives

Water is the most precious natural resource and it is hard to imagine life without it. Understanding the importance of water, soon after independence, the Government of India first established the Ministry of Irrigation which was later on upgraded as the Ministry of Water Resources in September 1985 and subsequently started functioning as the Ministry of Water Resources, River Development and Ganga Rejuvenation later on. Furthermore, since independence three major water related policies under the aegis of the Water Resource Council of Water have been implemented successfully in the country. The Ministry of Water Resources has further set up a number of other organizations which study different aspects of water and address the area specific water related matters in various parts of the country. Some of these organizations are as follows: The Bansagar Control Board, The Brahmaputra Board, The Central Ground Water Board, The Central Water Commission, The Farakka Barrage Project, The Ganga Flood Control Commission, The Narmada Control Authority, The National Institute of Hydrolology, The Sardar Sarovar Construction Advisory Committee, The Tungabhadra Board, The Upper Yamuna River Board to name a few.

The Road Map Ahead

Although a lot has been done through various river projects and water resource management schemes by the various successive governments of the country at the centre, state and local levels since

independence, yet due to the dwindling resources we encounter unprecedented challenges with every passing day. Moreover, another important issue that has not been met with regard to the to the water policies is that no matter how robust the water policies are, they are not executed with much efficiency. One of the reasons for this shortfall is that with the change of governments, the water related policies also undergo a major change of priorities which hampers the progress. Nonetheless, keeping in view the urgency with which the Water related issues need to be addresses, all the beneficiaries and the stakeholders too need to join hands in order to resolve the water relate issues that are threatening the existence of planet Earth. If all the sectors understand that their common stakes are under threat, and devise some mechanisms through which the problems can be addressed, then we can retrieve our planet which stands on the brink of extinction. If we collectively make up our mind to save our planet, then the water related issue can be addresses effectively through human engineering and other similar interventions.

Besides the above mentioned techniques, the water problem can also be tackled through sharing of water resources at both the national and international levels. The International Water Management Institute has been set up to address water related matters. The scientists at the International Water Management Institute have undertaken research on water and as per their findings there are around three hundred shared basins amongst various nations of the world which is quite a healthy sign for our planet. Another such organization functioning at the international level is the International Union for the Conservation of Nature which also is carrying out extensive research on the management of the water resources.

It is forecasted that by the year 2025 the underdeveloped and the developing countries of the world will be facing acute water shortage as a result of their rapidly growing populations. However, the developed countries of Europe and North America, due to the abundance of water resources found there and their manageable populations will not be confronting water crises. To tackle the estimated water crisis in the years to come, the need of the hour is to build strategic international collaborations regarding water sharing. Organizations such as the International Water Conservation Institute and the Union for Conservation of Water are working relentlessly to establish collaborations among nations so that the water related need of the people from all around the world are met.

Furthermore there are international organizations such as the Organization for Economic Co-operation and Development (OECD) that are working towards providing sophisticated infrastructure for a good water supply. All the above mentioned organization pay attention to the water related needs of the people from the developing countries. To meet the Millennium Development Goals the Organization for Economic Co-operation and Development (OECD) has set "targets of halving the proportion of the population lacking access to safe drinking water and basic sanitation by 2015, current annual investment on the order of USD 10 to USD 15 billion would need to be roughly doubled. This does not include investments required for the maintenance of existing infrastructure."

To conclude, water is a very important resource for the very existence of our planet. It is vital in order to sustain life not only on planet Earth but to support life in other planets as well so much so that astronauts too have undertaken many interstellar expeditions in the hope of finding water in other planets as well. We are standing at a critical juncture in time and need to act promptly in order to save the planet. At the individual level too we can opt for some simple water conservation mechanisms that will help us in doing our bit for the planet. In traditional societies man shared a symbiotic relationship with water as his dependence on water was a subsistent one. However, with the advent of industrialization, capitalism and consumerism have been on the rise and thus man's greed has become responsible for disturbing the equilibrium of the planet. We have reached that unfortunate phase in life where the life giving water has been commodified so much so that now a days we rely on packaged water bottles for safe drinking water. Due to the consumeristic tendencies of man the existence of all the waterbodies is under threat. Due to the construction of colossal Hydroelectricity projects, there have been irreversible ecological disturbances in the ecological system of the planet. In order to create spaces for these structures, vast patches of forest land are being cleared which threatens the plant and animal life of the region and thereby creates an ecological imbalance. It is incumbent on our governments that any policy that our governments frames should be a welfare-policy that fulfills the needs of all sectors harmoniously. The government should not let the market forces and the industrial sector manipulate its policies in order to fulfill its petty gains. Profit making should not be the sole purpose of the policies. Small and eco-friendly river projects should substitute the big ones like the Narmada, Tehri and the Pancheshwar dams which are a big threat to the environment. Unguarded

mining along the river banks also adversely impact the water resources and should be monitored.

In today's times when the market forces are governing practically every realm of life, the concept of a welfare state is fading into oblivion and thus the gulf between the rich and the poor widened further. In our daily lives too we see that on the one hand the people do not have access to drinking water; due to lack of irrigation facilities farmer are committing suicide; and every day children are succumbing to water borne diseases, however, on the other hand, the rich have lavish swimming pools and luxury baths at their homes. The industrial sector including the hospitality sector control most of the water supply. These are some of the many issues that need to be addressed else our very existence would be under threat.

Water is a precious gift for Planet Earth. It is vital for the existence of life. Thus, it is our collective responsibility to conserve it else our very existence will be under threat.

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